

Application No. 10/636,142
Response to Office Action

Customer No. 01933

Listing of Claims:

Claims 1-6 (Canceled).

7. (Previously Presented) A focus stabilizing apparatus comprising:

an objective lens arranged underneath an observation sample so as to face the observation sample;

5 a fixing base;

a sample base on which the observation sample is placed;

a focus adjusting mechanism, which continuously extends between the sample base and the fixing base and surrounds the objective lens, for varying a distance along an optical axis of the objective lens between the sample base and the fixing base;

10 a minute movement table to which the objective lens is fixed;

parallel springs situated between the fixing base and the minute movement table to allow the minute movement table to be moved in an optical axis direction of the objective lens;

15 an actuator provided between the fixing base and the minute movement table to minutely displace the minute movement table in the optical axis direction of the objective lens;

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20 a displacement sensor provided between the fixing base and
the minute movement table for detecting a displacement amount of
the objective lens; and

25 a controller which allows the actuator to perform an
extending/contracting operation based on a detection output of
the displacement sensor to control the objective lens and bring
the objective lens to a just-in-focus position relative to the
observation sample.

5 8. (Previously Presented) The focus stabilizing apparatus
according to claim 7, wherein when the objective lens is focused
on the observation sample by the focus adjusting mechanism, the
control means keeps the objective lens focused on the observation
sample.

9. (Previously Presented) The focus stabilizing apparatus
according to claim 7, wherein the focus stabilizing apparatus is
provided in an inverted microscope, and the fixing base is fixed
to a revolver of the inverted microscope.

10. (Currently Amended) A focus stabilizing apparatus
comprising:

an objective lens arranged underneath an observation sample
so as to face the observation sample;

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- 5 a fixing base;
 a stage on which the observation sample is placed;
 a minute movement table to which the objective lens is
fixed;
 parallel springs situated between the fixing base and the
10 minute movement table to allow the minute movement table to be
moved in an optical axis direction of the objective lens;
 an actuator provided between the fixing base and the minute
movement table to minutely displace the minute movement table in
the optical axis direction of the objective lens;
15 a displacement sensor provided between the stage and the
objective lens for detecting a displacement amount of produced
between the objective lens and the stage due to a change in
ambient temperature; and
 a controller which allows the actuator to perform an
20 extending/contracting operation based on a detection output of
the displacement sensor to control the objective lens and bring
the objective lens to a just-in-focus position relative to the
observation sample.

11. (Previously Presented) The focus stabilizing apparatus
according to claim 10, wherein said control means includes:

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5 a memory section for storing an output of the displacement sensor corresponding to a just-in-focus state between the observation sample and a focal point of the objective lens;

a comparing section for comparing an output of the displacement sensor and an output of the displacement sensor stored in the memory section; and

10 a control section for outputting an electrical signal for canceling a distance variation between the observation sample and the objective lens based on a result of comparison by the comparing section.

12. (Currently Amended) The focus stabilizing apparatus according to claim 10, wherein the focus stabilizing apparatus is provided in an inverted microscope, the fixing base is fixed to a revolver of the inverted microscope, and the stage is fixed on the inverted microscope above the revolver; and

wherein a distance between the objective lens and the stage changes when the change in the ambient temperature causes thermal drift of at least one of the inverted microscope, the fixing base, the revolver, and the stage.

13. (Previously Presented) The focus stabilizing apparatus according to claim 10, wherein the displacement sensor comprises

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a target provided in a vicinity of an end of the objective lens,
and a detector provided at the stage.

14. (Currently Amended) A focus stabilizing apparatus
comprising:

an objective lens arranged underneath an observation sample
so as to face the observation sample;

5 a fixing base;

a stage on which the observation sample is placed;

a minute movement table to which the objective lens is
fixed;

10 a movement mechanism which is provided between the fixing
base and the minute movement table, and which allows the minute
movement table to move in an optical axis direction of the
objective lens;

15 a drive mechanism which is provided between the fixing base
and the minute movement table, and which is adapted to minutely
displace the minute movement table in the optical axis direction
of the objective lens;

20 a displacement sensor provided between the stage and the
objective lens to detect a displacement amount of produced
between the objective lens and the stage because of a change in
ambient temperature; and

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a controller which allows the drive mechanism to operate based on a detection output of the displacement sensor to control the objective lens and to bring the objective lens to a just-in-focus position relative to the observation sample.

15. (Currently Amended) The focus stabilizing apparatus according to claim 14, wherein the focus stabilizing apparatus is provided in an inverted microscope, the fixing base is fixed to a revolver of the inverted microscope, and the stage is fixed on the inverted microscope above the revolver; and

wherein a distance between the objective lens and the stage changes when the change in the ambient temperature causes thermal drift of at least one of the inverted microscope, the fixing base, the revolver, and the stage.